

We claim:

1. In a multi-protocol label switching system (MPLS) data network comprised of
2 a plurality of data switches that are interconnected to form a plurality of data
3 paths from a source node to a destination node through a first set of data
4 switches, a method of establishing a protection path from said source switch to
5 said destination switch through a second set of switches, said method
6 comprised of the steps of:

7 a. sending a first predetermined control message, over a first data path from
8 said first switch to a second switch, said first predetermined message
9 establishing at least a working path through said network between said
10 first and second switches.

11 b. sending a second predetermined control message, over a second data path
12 from said first switch to a second switch, said second predetermined
13 message establishing at least a protection path through said network
14 between said first and second switches.

15 c. Associating said first working path to said protection path to enable
16 protection switching.



1 2. The method of claim 1 wherein said step of sending at least a first
2 predetermined message is comprised of the step of adding a protection
3 messaging field to a label distribution protocol (LDP) message, said protection
4 messaging field carrying protection pathway information between MPLS
5 network switch elements.

1 3. The method of claim 1 wherein said step of sending at least a first
2 predetermined message is comprised of the step of adding a protection
3 messaging field in an MPLS reservation protocol message (RSVP), said
4 protection field carrying protection pathway information between MPLS
5 network switch elements.

1 4. The method of claim 1 wherein said step of sending at least a first
2 predetermined message, over a first data path from said first switch to a
3 second switch, said first predetermined message establishing at least a
4 working path through said network between said first and second switches
5 includes the step of:

6 a. identifying at least one data switch of said MPLS network as a switch
7 element by the contents of at least one control field in a message field of
8 an MPLS message;
9 b. sending said at least one control field to at least one data switch of said
10 MPLS network.

1 5. The method of claim 1 wherein said step of sending at least a first
2 predetermined message, over a first data path from said first switch to a
3 second switch, said first predetermined message establishing at least a
4 protection path through said network between said first and second switches
5 includes the step of:

6 a. identifying at least one data switch of said MPLS network as a protection
7 switch element by the contents of at least one control field in a message
8 field of an MPLS message;
9 b. sending said at least one control field to at least one data switch of said
10 MPLS network.

1 6. The method of claim 1 wherein said step of label binding said first
2 predetermined message from said second switch to a third switch.

1 7. The method of claim 1 wherein said first data path is set up loosely.

1 8. The method of claim 1 wherein said first data path is set up explicitly.

1 9. The method of claim 1 further including the step of mapping labels to data
2 routed along said first data path according to predetermined criteria that
3 includes the quality of service to be granted said data.

1 10. In a multi-protocol label switching system (MPLS) data network comprised of
2 a plurality of data switches that are interconnected to form a plurality of data
3 paths from a source node to a destination node through a first set of data
4 switches, a method of establishing a working path from said source switch to
5 said destination switch through said first set of switches, said method
6 comprised of the steps of:

7 a. sending at least a first predetermined control message, over a first control
8 path from said first switch to a second switch, said first predetermined
9 control message establishing at least a working path through said network
10 between said first and second switches over which data is to be sent from
11 said source switch to said destination switch.

1 11. The method of claim 10 wherein said step of sending at least a first
2 predetermined control message is comprised of the step of adding a protection
3 messaging field to a label distribution protocol (LDP) message, said protection
4 messaging field carrying protection pathway information between MPLS
5 network switch elements.

1 12. The method of claim 10 wherein said step of sending at least a first
2 predetermined control message is comprised of the step of adding a protection
3 messaging field in an MPLS reservation protocol message (RSVP), said
4 protection field carrying protection pathway information between MPLS
5 network switch elements.

1 13. The method of claim 10 wherein said step of sending at least a first
2 predetermined control message, over a first data path from said first switch to
3 a second switch, said first predetermined control message establishing at least
4 a protection path through said network between said first and second switches
5 includes the step of:

6 a. identifying at least one data switch of said MPLS network as a protection
7 switch element by the contents of at least one data field in a message field
8 of an MPLS message;
9 b. sending said at least one data field to at least one data switch of said
10 MPLS network.

1 14. The method of claim 10 wherein said first data path is set up loosely.

1 15. The method of claim 10 wherein said first data path is set up explicitly.

1 16. The method of claim 10 further including the step of mapping labels to data
2 routed along said first control path according to predetermined criteria that
3 includes the quality of service to be granted said data.